

200500340

### <u> THIR UNITED STATES OF AMERICA</u>

TO ALL TO WHOM THESE PRESENTS: SHALL COME;

## Golorado Alheat Research Joundation

THEORY, THERE HAS BEEN PRESENTED TO THE

### Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC PRILENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE GIT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR CUING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE PURPOSE, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY OLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321

WHEAT, COMMON

'Hatcher'

In Jestimonn Marrest, I have hereunto set my hand and caused the seal of the Hunt Inviety Protection Office to be affixed at the City of Washington, D.C. this fifth day of June, in the year two thousand and six.

McCobone

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

	RIETY PROTECTION CERTIFICATE Ilection burden statement on reverse)	7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).					
1. NAME OF OWNER		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME	3. VARIETY NAME				
Colorado wheat R	exact foundation	~ CO180607	Hotcher				
4. ADDRESS (Street and No., or R.F.D. No., City,		5. TELEPHONE (include area code)	FOR OFFICIAL USE ONLY				
7100 South Chi Sufe 120	intow Street	303 - 7-2 ( -33 0 C	<b>PZ00</b> 500340				
Centennial, Co	9 BOLIZ	303-7-21-7555	FILING DATE				
7. IF THE OWNER NAMED IS NOT A "PERSON", ORGANIZATION (corporation, partnership, asso		9. DATE OF INCORPORATION					
Research foundati	ON		Sept. 2, 2005				
	ENTATIVE(S) TO SERVE IN THIS APPLICATION. (F)	rst person listed will receive all papers)	F FILING AND EXAMINATION FEES:				
	latery Ph.D. Crop Scornes Dep	it.	\$ \$ 3652. T				
	State uneversity		C GERIFICATION FEE:				
<del>-</del>	ling, co 80523		5 S 768.00 DATE APRIL 4, 2005				
11. TELEPHONE (include area code)	12. FAX (Include area code)	13. E-MAIL					
970-491-6483	970-491-0564		@ Colostate. edu				
14. CROPKIND (Common Name) Wheart, Common	16. FAMILY NAME (Botanical)	18. DOES THE VARIETY CONTA	IN ANY TRANSGENES? (OPTIONAL)				
15. GENUS AND SPECIES NAME OF CROP	Oramiweal  17. IS THE VARIETY A FIRST GENERATION HY	IF SO, PLEASE GIVE THE A	IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE				
Tritum gestavien	□ YES \$\frac{1}{2} O	COMMERICALIZATION.	APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERICALIZATION.				
19. CHECK APPROPRIATE BOX FOR EACH ATTA (Follow instructions on reverse)	ACHMENT SUBMITTED		Y THAT SEED OF THIS VARIETY BE SOLD AS A CLASS Section 83(a) of the Plant Variety Protection Act)				
a. Exhibit A. Origin and Breeding History	of the Variety	<b>1</b>	YES (if "yes", answer items 21 and 22 below) NO (if "no", go to item 23)				
b. Exhibit B. Statement of Distinctness		21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES?					
c. Exhibit C. Objective Description of Vari	iety	YES INO	YES NO				
d. Exhibit D. Additional Description of the			IF YES, WHICH CLASSES? FOUNDATION REGISTERED CERTIFIED  22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO				
e. Exhibit E. Statement of the Basis of the		NUMBER OF GENERATION	NUMBER OF GENERATIONS?				
	ed seeds or, for tuber propagated varieties, eposited and maintained in an approved public	YES NO  IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS.					
g. Filing and Examination Fee (\$3,652), m States" (Mail to the Plant Variety Protect	nade payable to "Treasurer of the United title of the United office)	•	FOUNDATION REGISTERED CERTIFIED  (If additional explanation is necessary, please use the space indicated on the reverse.)				
23. HAS THE VARIETY (INCLUDING ANY HARVES FROM THIS VARIETY BEEN SOLD, DISPOSED	STED MATERIAL) OR A HYBRID PRODUCED D OF, TRANSFERRED, OR USED IN THE U. S. OR		MPONENT OF THE VARIETY PROTECTED BY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)?				
OTHER COUNTRIES?  YES NO		☐ YES 📈 NO					
	FIRST SALE, DISPOSITION, TRANSFER, OR USE NCES. (Please use space indicated on reverse.)		TRY, DATE OF FILING OR ISSUANCE AND ASSIGNED use space indicated on reverse.)				
25. The owners declare that a viable sample of basi a tuber propagated variety a tissue culture will b	ic seed of the variety has been furnished with applical e deposited in a public repository and maintained for	ion and will be replenished upon request in ac the duration of the certificate,	cordance with such regulations as may be applicable, or for				
The undersigned owner(s) is(are) the owner of the entitled to protection under the provisions of Sec	his sexually reproduced or tuber propagated plant var ction 42 of the Plant Variety Protection Act.	lety, and believe(s) that the variety is new, dis	tinct, uniform, and stable as required in Section 42, and is				
Owner(s) is (are) informed that false representat	tion herein can jeopardize protection and result in per	natties.					
SIGNATURE OF OWNER		SIGNATURE OF OWNER					
NAME (Please print or type)		NAME (Please print or type)	IME (Ptease print or type)				
Stoll Haley							
Professor	B/26/05	CAPACITY OR TITLE	DATE				
<del></del>		· · · · · · · · · · · · · · · · · · ·					

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), ALL of the following items must be rec application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (in the sense that it will reproduce an entire plant) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filling fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. DO NOT use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

**Plant Variety Protection Office** Telephone: (301) 504-5518 FAX: (301) 504-5291

Homepage: http://www.ams.usda.gov/science/pvpo/pvpindex.htm

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact. Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 http://www.ams.usda.gov/lsg/seed.htm.

#### ITEM

19a. Give:

- (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
- (2) the details of subsequent stages of selection and multiplication:
- (3) evidence of uniformity and stability; and
- (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties;
  - (1) identify these varieties and state all differences objectively;
  - (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
  - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety,
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
- If "Yes" is specified (seed of this variety be sold by variety name only, as a class of certified seed), the applicant MAY NOT reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97, 103).
- See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
- 24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.
- 22. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

23. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

September 5, 2004 seed sold on Colorado, USA

24. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information

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To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

PVP Application
Hatcher Hard Red Winter Wheat
Exhibit A – Origin and Breeding History of the Variety

Pedigree – Hatcher was selected from the following crosses and backcrosses:

Yuma/PI 372129//TAM-200/3/4\*Yuma/4/KS91H184/Vista

Experimental designations – Hatcher was assigned the experimental identification number CO980607 in 1998. Hatcher is designated as PI 638512 in the U.S. National Plant Germplasm System.

#### Parents - The parents of Hatcher are:

- 1) Yuma a wheat cultivar developed and released by Colorado State University in 1991. Yuma is designated as PI 559720 in the U.S. National Plant Germplasm System.
- 2) PI 372129 a Russian wheat aphid-resistant landrace from Turkmenistan that carries the *Dn4* Russian wheat aphid resistance gene. PI 372129 is the source of the *Dn4* Russian wheat aphid (*Duiraphis noxia* Mordvilko) in Hatcher and other Russian wheat aphid resistant cultivars released by Colorado State University.
- 3) TAM-200 a wheat cultivar developed and released by Texas A&M University in 1987. TAM-200 is designated as PI 578255 in the U.S. National Plant Germplasm System.
- 4) KS91H184 an experimental line from Kansas State University derived from a random mating population involving CI 17884.
- 5) Vista a wheat cultivar released by the University of Nebraska in 1992. Vista is designated as PI 562653 in the U.S. National Plant Germplasm System.

#### Following are the breeding procedures used in the development of Hatcher:

- 1989 In spring 1989, Yuma was crossed as female with PI 372129 as male in the greenhouses at Fort Collins, Colorado. In fall 1989, an F1 plant from this cross was crossed as female with TAM-200 as male.
- 1990 In spring 1990, F1 seedlings from the cross Yuma/PI 372129//TAM-200 were vernalized in a cold chamber for 8 weeks at 2-4 °C. Following vernalization, plants were screened for resistance to Russian wheat aphid biotype 1 in standard greenhouse screening tests. One plant showing resistance to Russian wheat aphid biotype 1 was crossed as female to Yuma as male. This process was repeated in fall 1990 to generate the first backcross (Yuma/PI 372129//TAM-200/3/2\*Yuma).
- 1991 In fall 1991, F1 seedlings from the cross Yuma/PI 372129//TAM-200/3/2\*Yuma were vernalized and screened for Russian wheat aphid biotype 1 resistance as described above. One plant showing resistance was crossed as female to Yuma as male to generate the second backcross (Yuma/PI 372129//TAM-200/3/3\*Yuma).
- 1992 In fall 1992, F1 seedlings from the cross Yuma/PI 372129//TAM-200/3/3\*Yuma were vernalized and screened for Russian wheat aphid biotype 1 resistance as described above. One plant showing resistance was crossed as female to Yuma as male to generate the third backcross (Yuma/PI 372129//TAM-200/3/4\*Yuma). A separate cross was made in fall 1992 between KS91H184 as female and Vista as male.

- 1993 In fall 1993, F1 seedlings from the cross Yuma/PI 372129//TAM-200/3/4\*Yuma were vernalized and screened for Russian wheat aphid biotype 1 resistance as described above. A single BC3F1 plant showing resistance was crossed as female to an F1 plant from the cross KS91H184/Vista.
- 1994 In 1994, the F1 of Yuma/PI 372129//TAM-200/3/4\*Yuma/4/KS91H184/Vista was increased in the field at Fort Collins, CO, with planting in mid-February 1994. Seed was harvested in summer 1994 and planted as an F2 bulk population in September 1994.
- 1995 The F2 bulk population was grown in the field at Fort Collins, CO, along with a group of approximately 600 other F2 bulk populations in the breeding program. Selection among bulks was practiced by visual selection for maturity, plant height, straw strength, and overall agronomic adaptation. Seed of the bulk population was combine harvested in summer 1995 and planted as an F3 bulk population in September 1995.
- 1996 The F3 bulk population was grown in the field at Fort Collins, CO, along with a group of approximately 400 other F3 bulk populations in the breeding program. Selection among bulks was practiced by visual selection for maturity, plant height, straw strength, and overall agronomic adaptation. Seed of the bulk population was combine harvested in summer 1996 and planted as an F4 bulk population in September 1995.
- 1997 The F4 bulk population was grown in the field at Fort Collins, CO, along with a group of approximately 200 other F4 bulk populations in the breeding program. Selection among bulks was practiced by visual selection for maturity, plant height, straw strength, and overall agronomic adaptation. Selection of single heads within desirable bulk populations was done based on random head selection of approximately 100 heads within each bulk population. Seed of individual head selections was planted as F4:5 (F4-derived F5) headrows in September 1997.
- 1998 F4:5 headrows were grown at Fort Collins, CO. Line selections were made in July 1998 based on visual selection for maturity, plant height, straw strength, and overall agronomic adaptation. Seed harvested from the F4:5 headrows was then evaluated for size and color uniformity, near infrared reflectance (NIR) protein content, NIR grain hardness, and sodium dodecyl sedimentation volume. An F4:5 line selection designated as CO980607 was advanced for further testing following selection based on these criteria.
- 1999 The F4:6 was tested in the single-replication preliminary yield nursery at five CO locations (Akron, Burlington, Fort Collins, Julesburg, Walsh). Line CO980607 was advanced for further testing based on selection for grain yield, test weight, plant height, maturity, and overall agronomic adaptation.
- 2000 The F4:7 was tested in the replicated advanced yield nursery at the same five locations described above. Grain harvested from the trials in July 2000 was used for enduse quality evaluations in August 2000, including NIR protein content, NIR grain hardness, and mixograph water absorption, mixing time, and mixing tolerance. Data and observations from the field evaluations (grain yield, test weight, plant height, maturity, overall agronomic adaptation) and quality evaluations were used as selection criteria for advancement of CO980607 for further testing.
- 2001 The F4:8 was tested in the replicated Uniform Variety Performance Trial (UVPT) at 10 CO locations (Akron, Bennett, Burlington, Cheyenne Wells, Genoa, Julesburg, Lamar, Orchard, Sheridan Lake, Walsh). Grain harvested from the trials in July 2001 was used for end-use quality evaluations in August 2001, including NIR protein content, NIR grain hardness, and mixograph water absorption, mixing time, and mixing tolerance. Data and

observations collected from the field evaluations (yield, test weight, plant height, maturity, overall agronomic adaptation) and quality evaluations were used as selection criteria for advancement of CO980607 for further testing. Seed purification of CO980607 was initiated by random selection of 150 F4:8 heads from small increase plots grown at Fort Collins, CO, in 2001. The F4:8 head selections were planted as F8:9 headrows in November in Yuma, AZ.

- 2002 The F4:9 was tested in the replicated Uniform Variety Performance Trial at the same 10 CO locations listed above and in the Irrigated Variety Performance Trial (IVPT) at three CO locations (Fort Collins, Haxtun, Rocky Ford). Grain harvested from the trials in July 2002 was used for small-scale end-use quality evaluations as described above and experimental baking quality evaluations during winter 2002-2003. Data and observations collected from the field evaluations (yield, test weight, plant height, maturity, overall agronomic adaptation) and quality evaluations were used as selection criteria for advancement of CO980607 for further testing. Line CO980607 was also entered in the 2003 USDA-ARS Southern Regional Performance Nursery, planted in fall 2002. Off-type F8:9 headrows were removed from the headrow purification in Yuma, AZ, and 135 remaining headrows were composited. Breeder seed was planted from this composite in Fort Collins, CO, in September 2002.
- 2003 The F10 was tested in the replicated Uniform Variety Performance Trial and the Irrigated Variety Performance Trial at the same locations listed above. Grain harvested from the trials in July 2003 was used for small-scale end-use quality evaluations as described above and experimental baking quality evaluations during winter 2003-2004. Data and observations collected from the field evaluations (yield, test weight, plant height, maturity, overall agronomic adaptation) and quality evaluations were used as selection criteria for advancement of CO980607 for further testing. CO980607 was entered for a second year of testing in the 2004 USDA-ARS Southern Regional Performance Nursery, planted in fall 2003. The breeder seed (F8:10) was grown under irrigation at Fort Collins, CO. Foundation seed (F8:11) was planted under irrigation in Colorado in fall 2003.
- 2004 The F11 was tested in the replicated Uniform Variety Performance Trial and the Irrigated Variety Performance Trial at the same locations listed above. A six-acre Foundation Seed increase was grown under irrigation in Colorado. Based on yield performance, test weight, and end-use quality, CO980607 was assigned the name Hatcher and released for sale to seed producers in September 2004.

Hatcher is uniform. Variants are limited to: (1) slightly taller plants that occur at a frequency of less than 1 in 1,000 plants and (2) plants with brown glumes that occur at a frequency of less than 1 in 1,000 plants. The variants in Hatcher as well as the typical plants in Hatcher are commercially acceptable.

Hatcher is stable. When sexually reproduced, Hatcher remains unchanged in its essential and distinctive characteristics. Hatcher was observed to be uniform and stable during the last four generations of seed increase (preliminary seed increase in 2001, **bulk seed increase** in 2002, Breeder seed increase in 2003, and Foundation seed increase in 2004).

#### PVP Application Hatcher Hard Red Winter Wheat Exhibit B – Statement of Distinctness

Hatcher is most similar to the hard red winter wheat cultivar Yumar but differs in the following characteristics:

1) Hatcher has a significantly longer coleoptile than Yumar.

The following data are coleoptile length data (in mm) for Hatcher and Yumar from trials where both cultivars were evaluated with seed grown at the same location.

_Year	Nursery	Hatcher	Yumar	Difference
2000	AYN	91.3	66.7	24.6
2001	UVPT	74.0	59.0	15.0
2001	UVPT	70.0	67.0	3.0
2002	UVPT	74.6	63.5	11.1
2002	UVPT	75.4	65.7	9.7
2003	UVPT	74.3	63.1	11.3
2003	UVPT	68.3	60.0	8.3
2004	UVPT	75.3	61.2	14.1
2004	UVPT	76.7	64.1	12.7
2005	UVPT	96.2	61.5	34.7
2005	UVPT	76.5	61.7	14.8
	Average	77.5	63.0	14.5 **

<sup>\*\*</sup> Significantly different based on a meaningfully paired Student's T Test procedure (T-statistics: t ratio = 5.61; df = 10; P<0.001; upper/lower 95% confidence interval = 8.7 – 20.2 cm).

2) Hatcher is significantly shorter under typical field conditions than Yumar.

The following data are plant height data (in cm) for Hatcher and Yumar from trials where both cultivars were grown together. Each value represents the average of three replications.

Year	Location	Hatcher	Yumar	Difference
2000	Burlington	69.9	75.2	-5.3
2000	Julesburg	62.2	66.0	-3.8
2000	Walsh	62.2	62.2	0.0
2001	Akron	88.1	89.7	-1.7
2001	Briggsdale	78.7	86.4	-7.6
2001	Burlington	62.7	64.3	-1.7
2001	Cheyenne Wells	61.0	71.1	-10.2
2001	Genoa	61.0	61.0	0.0
2001	Julesburg	86.4	83.8	2.5
2001	Lamar	55.9	68.6	-12.7
2001	Walsh	61.8	66.0	-4.2
2002	Fort Collins	67.7	62.7	5.1
2002	Haxtun	88.9	88.9	0.0
2002	Rocky Ford	91.4	81.8	9.7
2002	Akron	62.7	59.3	3.4
2002	Julesburg	45.7	47.4	-1.7
2003	Akron	85.5	90.6	-5.1
2003	Burlington	61.0	61.8	-0.8
2003	Cheyenne Wells	53.3	66.0	-12.7
2003	Julesburg	84.7	87.2	-2.5
2003	Orchard	66.0	61.0	5.1
2003	Walsh	49.1	57.6	-8.5
2004	Akron	58.4	61.0	<b>-</b> 2.5
2004	Bennett	55.9	63.5	-7.6
2004	Fort Collins	67.7	79.4	-11.6
2004	Julesburg	61.0	66.0	-5.1
2004	Sheridan Lake	48.3	58.4	-10.2
2004	Yuma	63.5	63.5	0.0
2005	Akron	36.4	40.6	-4.2
2005	Arapahoe	55.9	45.7	10.2
2005	Burlington	43.2	47.4	-4.2
2005	Genoa	53.3	76.2	-22.9
2005	Julesburg	48.3	48.3	0.0
2005	Lamar	61.0	66.0	-5.1
2005	Sheridan Lake	66.0	58.4	7.6
2005	Walsh	66.9	67.7	-0.8
2005	Yuma	43.2	61.0	-17.8
	Average	63.1	66.5	-3.4

<sup>\*\*</sup> Significantly different based on a meaningfully paired Student's T Test procedure (T-statistics: t ratio = 2.97; df = 36; P<0.01; upper/lower 95% confidence interval = 1.09 – 5.77 cm).

3) Hatcher is moderately resistant to stripe rust, Yumar is moderately susceptible.

The following data are stripe rust infection scores (1=very resistant, 9=very susceptible) for Hatcher and Yumar from trials where both cultivars were grown together. The stripe rust race composition present at each location was not known.

Year	Location	Hatcher	Yumar	Difference
2003	Akron	5	6	1
2004	Fort Collins	5	7	2
2005	Genoa	2	4	2
2005	Walsh	4	5	1
	Average	4	5.5	1.5**

<sup>\*\*</sup> Significantly different based on a meaningfully paired Student's T Test procedure (T-statistics: t ratio = 5.19; df = 3; P<0.05; upper/lower 95% confidence interval = 0.6 - 2.4 score).

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U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY PLANT VARIETY PROTECTION OFFICE BELTSVILLE, MD 20705

Exhibit C

**OBJECTIVE DESCRIPTION OF VARIETY** Wheat (Triticum spp.)

VARIETY NAME
Hatcher
PVPO NUMBER 200500340
zero in the first box (e.g., 0 9 9 or 0 9 ) sed on a minimum of 100 plants. Comparative data plor standard may be used to determine plant colors ar variety; lack of response may delay progress of
ecify)
DWTH: e 2 = Semi-erect 3 = Erect
e) $2 = \text{Recurved}$ ed $2 = \text{Twisted}$ ent $2 = \text{Wax Present}$

2 = Purple

1 = Yellow

-					Exhibit
), PLANT	THEIGHT: (from soil to top	of head, excluding awns)			200500340
	cm Taller Than				
	Same As	Halt		*	
03	cm Shorter Than _	Yumar	:	*	
0. STEN	1:				
A. Al	NTHOCYANIN		D	. INTERNODE	
	1 = Absent 2 = Prese	ent		1 = Hollow	2 = Semi-solid 3 = Solid
•		vicini e e e di minimum di vivi di sette	Maria Santa Arabida Maria Santa Sant	5 Number of No	odes
B. W	AXY BLOOM		· E.	PEDUNCLE	
2-	1 = Absent 2 = Prese	nt		1 = Erect 2	2 = Recurved 3 = Semi-erect
		•	•	16 cm Leng	yth
C. H	AIRINESS (last internode o	f rachis)	F.	AURICLE	
	1 = Absent 2 = Prese	int		Anthocyanin:	1 = Absent 2 = Present
: <sup>*</sup>			. :	Hair:	1 = Absent 2 = Present
1. HEAD:	: (At Maturity)				
	ENSITY		C.	CURVATURE	
2	1 = Lax 2 = Middense (Laxidense 3 = Dense	<b>)</b>		1 = Erect 2 = Inclined 3 = Recurved	
B. SH	IAPE		D.	AWNEDNESS	
	1 = Tapering 2 = Strap 3 = Clavate			1 = Awnless 2 = Apically A 3 = Awnletted	
	4 = Other (Specify)			4 = Awned	
. GLUMI	ES: (At Maturity)				
A. CO	LOR		· E.	BEAK WIDTH	
1	1 = White	•		1 = Narrow	

#### 12

2 = Tan 3 = Other (Specify)

B. SHOULDER

1 = Wanting 3 = Rounded 2 = Oblique 4 = Square 5 = Elevated 6 7 = Other (Specify) 6 = Apiculate

C. SHOULDER WIDTH

1 = Narrow 2 = Medium 3 = Wide

D. BEAK

1 = Obtuse 3 2 = Acute 3 = Acuminate 3 = Wide

F. GLUME LENGTH

- 1 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)

G. WIDTH

r 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Long (ca. 4mm)

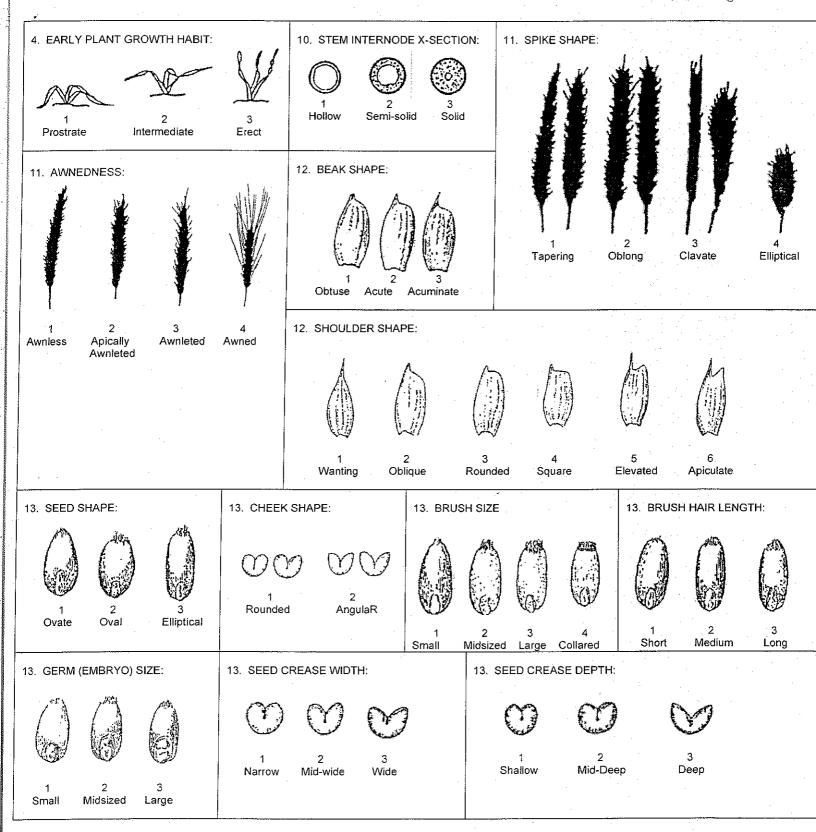
13. SI	EED:	200500340
Α	SHAPE	E. COLOR
	1 = Ovate 2 = Oval 3 = Elliptical	1 = White 2 = Amber 3 = Red 4 = Other (Specify)
В	CHEEK	F. TEXTURE
1	1 = Rounded 2 = Angular	1 = Hard 2 = Soft 3 = Other (Specify)
C.	BRUSH	G. PHENOL REACTION (See Instructions)
2	1 = Short 2 = Medium 3 = Long  1 = Not Collared 2 = Collared	1 = Ivory 4 = Dark Brown 2 = Fawn 5 = Black 3 = Light Brown
D.	CREASE	H. SEED WEIGHT
	1 = Width 60% or less of Kernel 2 = Width 80% or less of Kernel 3 = Width Nearly as Wide as Kernel	g/1000 Seed (Whole number only)
	1 = Depth 20% or less of Kernel	I. GERM SIZE
Ш	2 = Depth 35% or less of Kernel 3 = Depth 50% or less of Kernel	2 = Small 2 = Midsize 3 = Large
14. DIS	EASE: PLEASE INDICATE THE SPECIFIC RACE OR STRAIN	TESTED
3	(0 = Not Tested 1 = Susceptible 2  QFCS QTH)  Stem Rust (Puccinia graminis f. sp. tritici) RCRS TEME	2 = Resistant 3 = Intermediate 4 = Tolerant)    A
3	Stripe Rust (Puccinia striiformis) - UNKNOWN FACES	D Loose Smut (Ustilago tritici)
0		Plag Smut ( <i>Urocystis agropyri</i> )
0	Halo Spot (Selenophoma donacis)	Common Bunt ( <i>Tilletia tritici</i> or T. <i>laevis</i> )
Ô	Septoria nodorum (Glume Blotch)	Dwarf Bunt ( <i>Tilletia controversa</i> )
0	Septoria avenae (Speckied Leaf Disease)	Karnal Bunt ( <i>Tilletia indica</i> )
0	Septoria tritici (Speckled Leaf Blotch)	Powdery Mildew ( <i>Erysiphe graminis</i> f. sp. <i>tritici</i> )
0	Scab (Fusarium spp.)	Snow Molds"
0	"Black Point" (Kernel Smudge)	Common Root Rot (Fusarium, Cochliobolus and Bipolaris spp.)
	Barley Yellow Dwarf Virus (BYDV)	Rhizoctonia Root Rot ( <i>Rhizoctonia solani</i> )
0	Soilborne Mosaic Virus (SBMV)	Black Chaff (Xanthomonas campestris pv. translucens).
0	Wheat Yellow (Spindle Streak) Mosaic Virus	Bacterial Leaf Blight ( <i>Pseudomonas syringae</i> pv. syringae)
1	Wheat Streak Mosaic Virus (WSMV)	Other (Specify)
	Other (Specify)	Other (Specify)
	Other (Specify)	Other (Specify)
	Other (Specify)	Other (Specify)
15. INSE	ECT: (0 = Not Tested 1 = Susceptible 2 = Resistant	3 = Intermediate 4 = Tolerant)
	PLEASE SPECIFY	Y BIOTYPE (where needed)
3	Hessian Fly (Mayetiola destructor) Great Plains	Other (Specify)
0	Stem Sawfly (Cephus spp.)	Other (Specify)
0	Cereal Leaf Beetle (Oulema melanopa)	Other (Specify)

15.	INSECT: (continued)	0 = Not Tested	1 = Susceptible	2 = Resistant	3 = Intermediate	4 = Tolerant	*.
•	Russian Aphid (Dit	uraphis noxia) 🛭 🛭 🛭 🛭		SPECIFY BIOTYPE	(Where Needed)	2005	00340
	Greenbug (Schiza)	phis graminum) (		Ħ	Specify)		
	<b>O</b> Aphids	<u> </u>		Other (	Specify)		

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

For Russian wheat applied, biotype ( is the new designation for the original, North
American biotype.

200500340



# PVP Application Hatcher Hard Red Winter Wheat Exhibit D – Additional Description of the Variety (optional)

The following additional descriptive information is presented:

- 1) Table 1: Agronomic data summary from the 2001-2004 Dryland Colorado Variety Performance Trials (UVPT).
- 2) Table 2: Grain yield and test weight for Hatcher and other entries tested in Dryland Colorado Variety Performance Trials (UVPT; 2001 to 2004).
- 3) Table 3: Grain yield, test weight, and lodging scores for Hatcher and other entries tested in Irrigated Colorado Variety Performance Trials (IVPT; 2002 to 2004).
- 4) Table 4: Grain yield for Hatcher and other entries tested in dryland High Plains locations of the 2003 Southern Regional Performance Nursery (SRPN).
- 5) Table 5: Grain yield for Hatcher and other entries tested in dryland High Plains locations of the 2004 Southern Regional Performance Nursery (SRPN).
- 6) Table 6: Milling and bread baking characteristics of Hatcher, Ankor, and Prowers 99 across three composite quality evaluations and three individual location evaluations between 2000 and 2002 (n=6 evaluations).

Table 1. Agronomic data summary from the 2001-2004 Dryland Colorado Variety Performance Trials (UVPT).

	Heading Date	Plant Height	Straw Strength	Coleoptile Length	Shattering Score
	days <sup>†</sup>	in	score <sup>‡</sup>	mm	score§
Hatcher	143.5	25.8	2.0	73.6	3.6
Prairie Red	139.7	26.4	2.0	85.0	4.1
Halt	139.7	25.8	2.0	69.6	5.0
Stanton	142.6	28.4	2.0	77.7	4.1
Ankor	142.9	27.4	2.7	77.4	2.7
Yumar	143.1	27.3	2.0	62.9	4.2
Prowers 99	146.5	31.4	5.3	91.6	3.6
Observations	5	22	1	8	3

<sup>&</sup>lt;sup>†</sup> Days from January 1. <sup>‡</sup> 1=fully erect to 9=completely flat scale. <sup>§</sup> 1=minimal shatter to 9=severely shattered scale.

Table 2. Grain yield and test weight for Hatcher and other entries tested in Dryland Colorado Variety Performance Trials (UVPT; 2001 to 2004).

						Multiple Ye	ar Average	s	
		Grain Yield			•	Grain Yield			
Entry	2001	2002	2003	2004	2003-04	2002-04	2001-04	<u>Test Wt</u> 2001-04	
				bu/a				lb/bu	
Trego	47.8	34.3	52.9	47.7	50.5	47.0	47.3	59.7	
Hatcher	43.5	32.0	56.0	48.3	52.5	48.1	46.4	58.1	
Stanton	46.3	32.6	49.4	50.4	49.8	46.2	46.2	58.3	
Above	41.9	34.5	52.8	51.4	52.2	48.4	46.0	57.2	
Yuma	43.1	30.0	53.0	48.4	50.9	46.4	45.2	57.4	
Ankor	41.6	33.7	51.8	48.3	50.2	46.7	44.8	57.5	
Alliance	44.0	32.5	50.5	46.4	48.6	45.2	44.7	57.4	
Jagger	46.7	31.7	46.0	47.3	46.6	43.4	44.6	57.8	
Avalanche	41.3	31.6	50.4	50.6	50.5	46.5	44.6	59.0	
Akron	43.2	33.2	49.6	46.7	48.3	45.1	44.4	57.6	
Prairie Red	40.7	34.6	50.2	48.0	49.2	46.1	44.1	57.4	
Yumar	40.7	30.8	50.3	48.7	49.6	45.6	43.8	58.0	
Halt	42.9	34.7	46.7	41.9	44.5	42.4	42.6	57.3	
Prowers 99	41.4	31.8	45.4	42.2	43.9	41.3	41.4	59.2	
Average	42.7	32.8	50.1	47.7	49.0	45.6	44.5	57.9	
Locations	8	3	6	5	11	14	22	22	

Table 3. Grain yield, test weight, and lodging scores for Hatcher and other entries tested in Irrigated Colorado Variety Performance Trials (IVPT; 2002 to 2004).

***************************************			Grain Y	Test Wt	Lodging <sup>†</sup>		
Entry	2002	2003	2004	2003-04	2002-04	2002-04	2002-04
Yuma	92.6	107.1	114.6	110.1	105.1	57.2	1.8
Jagalene	92.4	115.1	100.7	109.4	104.5	58.3	1.9
Prairie Red	94.9	108.5	107.6	108.1	104.4	56.2	2.3
Wesley	90.9	107.1	98.6	103.7	100.1	57.9	1.1
Hatcher	90.2	101.4	101.6	101.4	98.2	57.9	4.6
Antelope	86.8	101.5	100.6	101.1	97.0	57.6	1.9
Dumas	84.3	100.3	101.0	100.6	95.9	58.8	1.0
Ok102		96.2	106.1	100.2		***	1.2
Ankor	88.7	94.3	108.9	100.1	96.9	56.2	3.9
Platte	95.8	98.8	92.5	96.3	96.2	57.2	1.0
Nuplains	89.5	81.0	99.9	88.5	88.8	58.1	1.8
Average	90.6	101.0	102.9	101.8	98.7	57.5	2.1
Locations	3	3	2	5	8	8	3

† 1=fully erect to 9=completely flat scale.

Table 4. Grain yield for Hatcher and other entries tested in dryland High Plains locations of the 2003 Southern Regional Performance Nursery (SRPN). **Hatcher and checks are bolded.** 

ENTRYIND		303 Southern Regio				·			are boi	aea.
36 Hatcher 85.0 91.9 84.2 69.8 45.7 59.8 52.9 69.9 30 KS940786-6-9 86.8 86.3 91.9 64.7 37.3 60.7 59.3 69.6 82.2 50 KS940786-6-9 86.8 86.3 91.9 64.7 37.3 60.7 59.3 69.6 82.2 50 KS940786-6-9 81.8 81.3 81.3 86.2 72.8 44.8 67.8 40.7 67.9 31 WS9-194 81.8 81.3 86.2 72.8 44.8 67.8 40.7 67.9 31 WS9-194 84.8 88.0 90.3 62.4 40.3 52.5 54.0 67.5 35 COS80376 70.5 85.1 92.3 66.3 40.8 63.1 46.9 66.4 39 COS9314 77.4 91.8 85.1 66.6 38.8 47.2 50.2 65.3 26 OK98890 83.3 78.7 81.8 60.5 36.3 58.2 57.5 65.2 41 TX9SA0155 79.9 87.3 86.3 65.6 37.4 51.3 47.5 65.1 24 OK94P549-21 81.0 86.6 89.1 61.5 26.6 51.0 55.3 64.9 33 WS9K1375-06 84.2 81.0 86.3 56.4 39.2 44.9 52.1 63.5 18 GS86411W 68.2 85.3 74.7 58.6 39.3 56.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 35.6 45.1 49.2 63.3 10 GS82159 77.5 84.5 74.9 63.7 31.9 54.7 49.1 62.3 3 XY97V5300 79.7 84.2 79.3 64.6 36.8 49.0 42.0 62.2 33 CK98699 77.4 75.9 82.3 64.6 36.8 49.0 42.0 62.2 33 CK98699 77.4 75.9 82.3 62.5 37.9 56.3 40.6 61.8 17 KS980131-0 17.0 80.7 17.5 84.5 76.9 82.3 62.5 37.9 56.3 40.6 61.8 17 XS9801811-0 17.0 80.7 4.8 81.5 61.5 29.1 50.6 43.8 61.7 22 OK95548-98-6654 81.1 69.2 86.0 59.8 27.5 62.8 45.5 61.7 22 OK95548-98-6654 81.1 69.2 86.0 59.8 27.5 62.8 45.5 61.7 22 OK95548-98-6654 81.1 69.2 86.0 59.8 27.5 62.8 45.5 61.7 61.7 61.8 11.7 67.7 61.8 1.7 76.7 61.5 62.3 31.9 55.7 35.3 61.4 61.7 0.9 0.9 0.9 70.0 78.8 64.2 37.3 51.8 47.3 61.2 0.0 0.9 0.0 0.9 0.9 70.0 78.8 64.2 37.3 51.8 47.3 61.2 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0			Hays	Colby	Akron	Julesburg	Burlington	N Platte	Sidney	Average
36 Hatcher 38.0  S94.0768-6-9  88.8  88.3  S91.9  S84.2  S98.8  S2.9  S9.9  S8.8  S2.9  S9.9  S8.8  S2.9  S9.9  S8.8  S2.9  S9.9  S8.8  S8	37	CO980630	77.1	91.5	89.5	74.0	51.9	56.7	60.5	71.6
30 KS940786-8-9 86.8 86.3 91.9 64.7 37.3 60.7 59.3 69.6 82 27.928 44.8 52.6 50.6 68.2 25 0K94P549-11 81.8 81.3 86.2 72.8 44.8 67.8 40.7 67.9 31 W99-194 84.8 88.0 90.3 62.4 40.3 52.5 54.0 67.5 55 00980376 70.5 85.1 92.3 66.3 40.8 63.1 46.9 66.4 39 CO99314 77.4 91.8 85.1 66.6 38.8 47.2 50.2 65.3 26 0K94890 33.3 78.7 81.8 60.5 36.3 58.2 57.5 65.2 41 TX99A0155 79.9 87.3 86.3 65.6 37.4 51.3 47.5 65.1 40.946749-21 81.0 86.6 89.1 61.5 26.6 51.0 58.3 64.9 83.3 W9647375-06 84.2 81.0 86.3 56.4 39.2 44.9 52.1 63.5 16 0980411W 68.2 85.3 74.7 69.6 39.3 58.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 39.3 58.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 39.3 58.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 39.3 58.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 39.3 58.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 39.3 58.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 39.3 68.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 39.3 58.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 39.3 68.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 39.3 68.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 35.6 45.1 49.2 63.3 7 T136 74.9 80.9 82.6 65.2 38.1 63.4 36.5 63.1 10 G982159 77.5 84.5 74.9 63.7 31.9 54.7 49.1 62.3 43 TX97V5300 79.7 84.2 79.3 64.6 36.8 49.0 42.0 62.2 23 0K98699 77.4 75.9 82.3 62.5 37.9 56.3 40.6 61.8 17 NE99543 77.6 81.7 76.7 62.4 34.7 52.5 47.1 61.8 47.3 47.5 67.5 67.5 67.5 67.5 67.5 67.5 67.5 6	36	Hatcher	85.0	91.9	84.2	69.8	45.7	59.8		69.9
42 TX98V9628 87.3 83.7 83.5 73.6 46.1 52.6 50.6 68.2 50.0 694549-11 81.8 81.3 86.2 72.8 44.8 67.8 40.7 67.9 31 W99-194 84.8 838.0 90.3 62.4 40.3 65.5 54.0 67.5 35 CO980376 70.5 85.1 92.3 66.3 40.8 63.1 46.9 66.4 39 CO99314 77.4 91.8 85.1 66.3 38.8 47.2 50.2 65.3 26 0K98690 83.3 78.7 81.8 60.5 36.3 58.2 57.5 65.2 41 TX99A0155 79.9 87.3 86.3 65.6 37.4 51.3 47.5 65.1 24 0K94P549-21 81.0 86.6 89.1 61.5 26.6 51.0 58.3 64.9 33 W96x1375-06 84.2 81.0 86.3 56.4 39.2 44.9 52.1 63.5 16 G980411W 68.2 85.3 74.7 69.6 39.3 56.0 48.8 63.4 4 Trego 76.8 82.5 85.9 86.0 35.6 45.1 49.2 63.3 10 G982159 77.5 84.5 74.9 63.7 31.9 54.7 49.1 62.3 43 TX97V5300 79.7 84.2 79.3 64.6 36.8 49.0 42.0 62.2 33 CK98699 77.4 75.9 82.3 62.5 37.9 56.3 40.6 61.8 4 W96x131-10 T.8.0 87.4 81.5 61.5 29.1 50.6 43.8 61.7 17.2 0K9548-98-6654 81.1 69.2 86.0 59.8 27.5 62.8 45.5 61.7 42.0 CK95548-98-6654 81.1 69.2 86.0 59.8 27.5 62.8 45.5 61.7 44.7 81.1 75.3 59.7 30.1 59.9 47.8 61.2 40 CO99W192 71.3 84.6 72.2 54.1 37.9 51.1 50.6 43.8 61.7 44.1 75.3 59.7 30.1 59.9 47.8 61.2 40 CO99W192 71.3 84.6 72.2 54.1 37.9 51.1 50.6 43.8 61.7 44.1 TX99U8618 67.4 84.9 87.4 61.1 33.3 55.7 62.8 45.5 60.6 61.8 T1.7 67.7 62.4 41.1 50.6 43.8 61.7 44.1 T1.7 53.5 59.7 30.1 59.9 47.8 61.2 40 CO99W192 71.3 84.6 72.2 54.1 37.9 51.1 52.9 60.6 41.4 TX99U8618 67.4 84.9 87.4 61.2 37.3 51.8 47.3 51.2 60.6 61.8 T1.7 67.7 67.7 67.7 67.5 62.4 41.1 75.9 69.9 79.0 78.8 64.2 37.3 51.8 47.3 61.2 40 CO99W192 71.3 84.6 72.2 54.1 37.9 51.1 52.9 60.6 41.4 TX99U8618 67.4 84.9 87.4 61.2 37.3 51.8 47.3 61.2 40 CO99W192 71.3 84.6 72.2 54.1 37.9 51.1 52.9 60.6 61.8 T1.7 67.7 67.7 67.5 61.2 31.3 50.1 48.1 60.3 51.4 T1.7 59.8 61.2 31.3 50.1 48.1 60.3 51.4 51.7 59.9 50.0 44.1 TX99U8618 73.6 74.8 83.2 76.1 65.5 52.2 44.1 37.9 51.1 52.9 60.6 61.8 T1.7 61.2 61.2 61.2 61.2 61.2 61.2 61.2 61.2	30	KS940786-6-9	86.8	86.3						
25 OK94P549-11 81.8 81.3 86.2 72.8 44.8 67.8 40.7 67.9 31 W99-194 84.8 88.0 90.3 62.4 40.3 52.5 54.0 67.5 35 CO980376 70.5 85.1 92.3 66.3 40.8 63.1 46.9 66.4 39 CO99314 77.4 91.8 85.1 66.6 83.8 47.2 50.2 65.3 26 OK98690 83.3 78.7 81.8 60.5 36.3 58.2 57.5 65.2 41 TX99A0155 79.9 87.3 86.3 65.6 37.4 51.3 47.5 65.1 24 OK94P549-21 81.0 86.6 89.1 61.5 26.6 51.0 58.3 64.9 33 W96x1375-06 84.2 81.0 86.3 56.4 39.2 44.9 52.1 63.5 16 G980411W 68.2 85.3 74.7 69.6 39.3 58.0 48.8 63.4 4 Trego 76.8 82.5 85.9 68.0 35.6 45.1 49.2 63.3 7 T136 74.9 80.9 82.6 65.2 38.1 63.4 36.5 63.1 10 G982159 77.5 84.5 74.9 63.7 31.9 54.7 49.1 62.3 23 OK98699 77.4 75.9 82.3 62.5 37.9 56.3 40.6 61.8 17 NE99643 77.6 81.7 67.7 62.4 34.7 52.5 47.1 61.8 24 OK95548-98-6654 81.1 69.2 86.0 59.8 27.5 62.8 45.5 61.7 26 TX99U8518 67.4 84.9 87.4 61.1 38.3 55.7 35.3 61.4 27 OK95548-98-6654 81.1 69.2 86.0 59.8 27.5 62.8 45.5 61.7 28 OK95549-96-654 81.1 69.2 86.0 59.8 27.5 62.8 45.5 61.7 29 KS00HW175-4 69.9 79.0 78.8 64.2 37.3 51.8 47.3 61.2 40 CO99W192 74.8 83.2 78.1 65.5 32.2 45.3 45.5 60.6 61.8 1137 74.4 81.1 75.3 59.7 50.1 59.9 47.8 61.2 9 KS00HW175-4 69.9 79.0 78.8 64.2 37.3 51.8 47.3 61.2 40 CO99W192 74.8 83.2 78.1 65.5 32.2 45.3 45.5 60.6 60.6 61.8 17.3 79.9 63.3 79.9 63.3 44.6 60.5 61.4 17.3 61.2 60.5 61.2 61.2 61.2 61.2 61.2 61.2 61.2 61.2	42	2 TX98V9628	87.3							
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8         T137         74.4         81.1         75.3         59.7         30.1         59.9         47.8         61.2           9         KS00HW175-4         69.9         79.0         78.8         64.2         37.3         51.8         47.3         61.2           40         CO99W192         74.8         83.2         78.1         65.5         32.2         45.3         45.5         60.6           18         NE00429         71.3         84.6         72.2         54.1         37.9         51.1         52.9         60.6           44         TX96D1073         72.3         73.5         88.0         54.3         37.5         63.2         34.4         60.5           21         OK96705-99-6738         78.4         78.9         73.4         62.2         31.3         50.1         48.1         60.3           45         TX98D2316         73.6         76.5         91.7         59.1         20.2         49.7         51.5         60.3           3         TAM-107         69.9         71.7         84.5         68.1         33.6         44.8         49.5         60.3           15         G980129W         78.4         73.5         72										
9 KS00HW175-4 69.9 79.0 78.8 64.2 37.3 51.8 47.3 61.2 40 CO99W192 74.8 83.2 78.1 65.5 32.2 45.3 45.5 60.6 18 NE00429 71.3 84.6 72.2 54.1 37.9 51.1 52.9 60.6 44 TX96D1073 72.3 73.5 88.0 54.3 37.5 63.2 34.4 60.5 21 OK96705-99-6738 78.4 78.9 73.4 62.2 31.3 50.1 48.1 60.3 45 TX98D2316 73.6 76.5 91.7 59.1 20.2 49.7 51.5 60.3 3 TAM-107 69.9 71.7 84.5 68.1 33.6 44.8 49.5 60.3 15 G980129W 78.4 73.5 72.4 61.4 31.9 59.1 41.7 59.8 16 G982241 72.5 81.0 77.4 53.6 38.2 59.3 32.6 59.2 20 NE00564 71.1 78.1 68.3 65.3 31.9 57.7 40.4 59.0 28 KS940748-2-2 75.1 78.0 70.8 58.0 26.6 56.2 43.2 58.3 29 Overley 77.9 72.7 69.8 57.4 28.4 59.0 42.1 58.2 32 W96x1080-21 89.4 73.4 70.2 51.3 25.5 58.6 36.9 57.9 19 NE00544 71.4 78.7 65.5 58.7 32.5 54.9 43.4 57.9 27 OK99215 67.8 68.9 82.0 55.0 33.7 55.1 42.3 57.8 5 71.3 68.5 70.0 82.8 58.3 35.3 46.9 37.2 57.0 6 71.39 74.6 70.1 67.0 56.3 37.2 54.1 38.7 56.9 38 CO99141 71.2 82.2 73.7 57.4 30.6 37.8 44.6 56.8 13 G980122 63.8 70.6 72.6 62.7 28.3 57.3 39.2 56.4 12 G980039 84.7 70.8 69.2 58.5 22.2 50.8 35.7 56.0 42.2 Scout 66 63.6 63.6 66.0 72.0 48.5 31.5 35.4 43.7 51.5 15.1 Kharkof 45.5 52.4 48.3 44.9 21.1 38.3 45.1 42.2 Average 75.5 78.8 78.9 61.2 34.4 53.5 45.3 LSD 0.05 7.1 11.3 14.2 7.6 61.1 13.3 13.5										
40 CO99W192 74.8 83.2 78.1 65.5 32.2 45.3 45.5 60.6 18 NEO0429 71.3 84.6 72.2 54.1 37.9 51.1 52.9 60.6 44 TX96D1073 72.3 73.5 88.0 54.3 37.5 63.2 34.4 60.5 21 OK96705-99-6738 78.4 78.9 73.4 62.2 31.3 50.1 48.1 60.3 45 TX98D2316 73.6 76.5 91.7 59.1 20.2 49.7 51.5 60.3 3 TAM-107 69.9 71.7 84.5 68.1 33.6 44.8 49.5 60.3 15 G980129W 78.4 73.5 72.4 61.4 31.9 59.1 41.7 59.8 11 G982241 72.5 81.0 77.4 53.6 38.2 59.3 32.6 59.2 20 NE00564 71.1 78.1 68.3 65.3 31.9 57.7 40.4 59.0 28 KS940748-2-2 75.1 78.0 70.8 58.0 26.6 56.2 43.2 58.3 29 Overley 77.9 72.7 69.8 57.4 28.4 59.0 42.1 58.2 32 W96x1080-21 89.4 73.4 70.2 51.3 25.5 58.6 36.9 57.9 19 NE00544 71.4 78.7 65.5 58.7 32.5 54.9 43.4 57.9 27 OK99215 67.8 68.9 82.0 55.0 33.7 55.1 42.3 57.8 5 T133 68.5 70.0 82.8 58.3 35.3 46.9 37.2 57.0 6 T139 74.6 70.1 67.0 56.3 37.2 54.1 38.7 56.9 38 CO99141 71.2 82.2 73.7 57.4 30.6 37.8 44.6 56.8 13 G980122 63.8 70.6 72.6 62.7 28.3 57.3 39.2 56.4 2 Scout 66 63.6 66.0 72.0 68.8 49.9 34.2 50.5 33.3 52.6 2 Scout 66 63.6 66.0 72.0 48.5 31.5 35.4 43.7 51.5 1 Kharkof 45.5 52.4 48.3 44.9 21.1 38.3 45.1 42.2										
18         NE00429         71.3         84.6         72.2         54.1         37.9         51.1         52.9         60.6           44         TX96D1073         72.3         73.5         88.0         54.3         37.5         63.2         34.4         60.5           21         OK96705-99-6738         78.4         78.9         73.4         62.2         31.3         50.1         48.1         60.3           45         TX98D2316         73.6         76.5         91.7         59.1         20.2         49.7         51.5         60.3           3         TAM-107         69.9         71.7         84.5         68.1         33.6         44.8         49.5         60.3           15         G980129W         78.4         73.5         72.4         61.4         31.9         59.1         41.7         59.8           11         G982241         72.5         81.0         77.4         53.6         38.2         59.3         32.6         59.2           20         NE00564         71.1         78.1         68.3         65.3         31.9         57.7         40.4         59.0           28         KS940748-2-2         75.1         78.0         <										
44       TX96D1073       72.3       73.5       88.0       54.3       37.5       63.2       34.4       60.5         21       OK96705-99-6738       78.4       78.9       73.4       62.2       31.3       50.1       48.1       60.3         45       TX98D2316       73.6       76.5       91.7       59.1       20.2       49.7       51.5       60.3         3       TAM-107       69.9       71.7       84.5       68.1       33.6       44.8       49.5       60.3         15       G980129W       78.4       73.5       72.4       61.4       31.9       59.1       41.7       59.8         11       G982241       72.5       81.0       77.4       53.6       38.2       59.3       32.6       59.2         20       NE00564       71.1       78.1       68.3       65.3       31.9       57.7       40.4       59.0         28       KS940748-2-2       75.1       78.0       70.8       58.0       26.6       56.2       43.2       58.3         29       Overley       77.9       72.7       69.8       57.4       28.4       59.0       42.1       58.2         32										
21 OK96705-99-6738 78.4 78.9 73.4 62.2 31.3 50.1 48.1 60.3 45 TX98D2316 73.6 76.5 91.7 59.1 20.2 49.7 51.5 60.3 <b>TAM-107</b> 69.9 71.7 84.5 68.1 33.6 44.8 49.5 60.3 15 G980129W 78.4 73.5 72.4 61.4 31.9 59.1 41.7 59.8 11 G982241 72.5 81.0 77.4 53.6 38.2 59.3 32.6 59.2 20 NE00564 71.1 78.1 68.3 65.3 31.9 57.7 40.4 59.0 28 KS940748-2-2 75.1 78.0 70.8 58.0 26.6 56.2 43.2 58.3 29 Overley 77.9 72.7 69.8 57.4 28.4 59.0 42.1 58.2 32 W96x1080-21 89.4 73.4 70.2 51.3 25.5 58.6 36.9 57.9 19 NE00544 71.4 78.7 65.5 58.7 32.5 54.9 43.4 57.9 27 OK99215 67.8 68.9 82.0 55.0 33.7 55.1 42.3 57.8 5 T133 68.5 70.0 82.8 58.3 35.3 46.9 37.2 57.0 6 T139 74.6 70.1 67.0 56.3 37.2 54.1 38.7 56.9 38 CO99141 71.2 82.2 73.7 57.4 30.6 37.8 44.6 56.8 13 G980122 63.8 70.6 72.6 62.7 28.3 57.3 39.2 56.4 29.0 12 G980039 84.7 70.8 69.2 58.5 22.2 50.8 35.7 56.0 14 G982163 73.5 60.0 66.8 49.9 34.2 50.5 33.3 52.6 2 Scout 66 63.6 66.0 72.0 48.5 31.5 35.4 43.7 51.5 42.2 Average 75.5 78.8 78.9 61.2 34.4 53.5 45.3 LSD 0.05 7.1 11.3 14.2 7.6 6.1 13.3 13.5									52.9	
45         TX98D2316         73.6         76.5         91.7         59.1         20.2         49.7         51.5         60.3           3         TAM-107         69.9         71.7         84.5         68.1         33.6         44.8         49.5         60.3           15         G980129W         78.4         73.5         72.4         61.4         31.9         59.1         41.7         59.8           11         G982241         72.5         81.0         77.4         53.6         38.2         59.3         32.6         59.2           20         NE00564         71.1         78.1         68.3         65.3         31.9         57.7         40.4         59.0           28         KS940748-2-2         75.1         78.0         70.8         58.0         26.6         56.2         43.2         58.3           29         Overley         77.9         72.7         69.8         57.4         28.4         59.0         42.1         58.2           32         W96x1080-21         89.4         73.4         70.2         51.3         25.5         58.6         36.9         57.9           19         NE00544         71.4         78.7         65.					88.0	54.3	37.5	63.2	34.4	60.5
3         TAM-107         69.9         71.7         84.5         68.1         33.6         44.8         49.5         60.3           15         G980129W         78.4         73.5         72.4         61.4         31.9         59.1         41.7         59.8           11         G982241         72.5         81.0         77.4         53.6         38.2         59.3         32.6         59.2           20         NE00564         71.1         78.1         68.3         65.3         31.9         57.7         40.4         59.0           28         KS940748-2-2         75.1         78.0         70.8         58.0         26.6         56.2         43.2         58.3           29         Overley         77.9         72.7         69.8         57.4         28.4         59.0         42.1         58.2           32         W96x1080-21         89.4         73.4         70.2         51.3         25.5         58.6         36.9         57.9           19         NE00544         71.4         78.7         65.5         58.7         32.5         54.9         43.4         57.9           27         OK99215         67.8         68.9         82.0<			78.4	78.9	73.4	62.2	31.3	50.1	48.1	60.3
15 G980129W 78.4 73.5 72.4 61.4 31.9 59.1 41.7 59.8 11 G982241 72.5 81.0 77.4 53.6 38.2 59.3 32.6 59.2 20 NE00564 71.1 78.1 68.3 65.3 31.9 57.7 40.4 59.0 28 KS940748-2-2 75.1 78.0 70.8 58.0 26.6 56.2 43.2 58.3 29 Overley 77.9 72.7 69.8 57.4 28.4 59.0 42.1 58.2 32 W96x1080-21 89.4 73.4 70.2 51.3 25.5 58.6 36.9 57.9 19 NE00544 71.4 78.7 65.5 58.7 32.5 54.9 43.4 57.9 27 OK99215 67.8 68.9 82.0 55.0 33.7 55.1 42.3 57.8 5 T133 68.5 70.0 82.8 58.3 35.3 46.9 37.2 57.0 6 T139 74.6 70.1 67.0 56.3 37.2 54.1 38.7 56.9 38 CO99141 71.2 82.2 73.7 57.4 30.6 37.8 44.6 56.8 13 G980122 63.8 70.6 72.6 62.7 28.3 57.3 39.2 56.4 298039 84.7 70.8 69.2 58.5 22.2 50.8 35.7 56.0 4982163 73.5 60.0 66.8 49.9 34.2 50.5 33.3 52.6 2 Scout 66 63.6 66.0 72.0 48.5 31.5 35.4 43.7 51.5 1 Kharkof 45.5 52.4 48.3 44.9 21.1 38.3 45.1 42.2 Average 75.5 78.8 78.9 61.2 34.4 53.5 45.3 LSD 0.05 7.1 11.3 14.2 7.6 6.1 13.3 13.5	45			76.5	91.7	59.1	20.2	49.7	51.5	60.3
11 G982241       72.5       81.0       77.4       53.6       38.2       59.3       32.6       59.2         20 NE00564       71.1       78.1       68.3       65.3       31.9       57.7       40.4       59.0         28 KS940748-2-2       75.1       78.0       70.8       58.0       26.6       56.2       43.2       58.3         29 Overley       77.9       72.7       69.8       57.4       28.4       59.0       42.1       58.2         32 W96x1080-21       89.4       73.4       70.2       51.3       25.5       58.6       36.9       57.9         19 NE00544       71.4       78.7       65.5       58.7       32.5       54.9       43.4       57.9         27 OK99215       67.8       68.9       82.0       55.0       33.7       55.1       42.3       57.8         5 T133       68.5       70.0       82.8       58.3       35.3       46.9       37.2       57.0         6 T139       74.6       70.1       67.0       56.3       37.2       54.1       38.7       56.9         38 CO99141       71.2       82.2       73.7       57.4       30.6       37.8       44.6       56.	3		69.9	71.7	84.5	68.1	33.6	44.8	49.5	60.3
20 NE00564       71.1       78.1       68.3       65.3       31.9       57.7       40.4       59.0         28 KS940748-2-2       75.1       78.0       70.8       58.0       26.6       56.2       43.2       58.3         29 Overley       77.9       72.7       69.8       57.4       28.4       59.0       42.1       58.2         32 W96x1080-21       89.4       73.4       70.2       51.3       25.5       58.6       36.9       57.9         19 NE00544       71.4       78.7       65.5       58.7       32.5       54.9       43.4       57.9         27 OK99215       67.8       68.9       82.0       55.0       33.7       55.1       42.3       57.8         5 T133       68.5       70.0       82.8       58.3       35.3       46.9       37.2       57.0         6 T139       74.6       70.1       67.0       56.3       37.2       54.1       38.7       56.9         38 C099141       71.2       82.2       73.7       57.4       30.6       37.8       44.6       56.8         13 G980122       63.8       70.6       72.6       62.7       28.3       57.3       39.2       56.	15		78.4	73.5	72.4	61.4	31.9	59.1	41.7	59.8
20 NE00564       71.1       78.1       68.3       65.3       31.9       57.7       40.4       59.0         28 KS940748-2-2       75.1       78.0       70.8       58.0       26.6       56.2       43.2       58.3         29 Overley       77.9       72.7       69.8       57.4       28.4       59.0       42.1       58.2         32 W96x1080-21       89.4       73.4       70.2       51.3       25.5       58.6       36.9       57.9         19 NE00544       71.4       78.7       65.5       58.7       32.5       54.9       43.4       57.9         27 OK99215       67.8       68.9       82.0       55.0       33.7       55.1       42.3       57.8         5 T133       68.5       70.0       82.8       58.3       35.3       46.9       37.2       57.0         6 T139       74.6       70.1       67.0       56.3       37.2       54.1       38.7       56.9         38 C099141       71.2       82.2       73.7       57.4       30.6       37.8       44.6       56.8         13 G980122       63.8       70.6       72.6       62.7       28.3       57.3       39.2       56.	11	G982241	72.5	81.0	77.4	53.6	38.2	59.3	32.6	59.2
28 KS940748-2-2       75.1       78.0       70.8       58.0       26.6       56.2       43.2       58.3         29 Overley       77.9       72.7       69.8       57.4       28.4       59.0       42.1       58.2         32 W96x1080-21       89.4       73.4       70.2       51.3       25.5       58.6       36.9       57.9         19 NE00544       71.4       78.7       65.5       58.7       32.5       54.9       43.4       57.9         27 OK99215       67.8       68.9       82.0       55.0       33.7       55.1       42.3       57.8         5 T133       68.5       70.0       82.8       58.3       35.3       46.9       37.2       57.0         6 T139       74.6       70.1       67.0       56.3       37.2       54.1       38.7       56.9         38 C099141       71.2       82.2       73.7       57.4       30.6       37.8       44.6       56.8         13 G980122       63.8       70.6       72.6       62.7       28.3       57.3       39.2       56.4         12 G980039       84.7       70.8       69.2       58.5       22.2       50.8       35.7       56.	20	NE00564	71.1		68.3					
29 Overley       77.9       72.7       69.8       57.4       28.4       59.0       42.1       58.2         32 W96x1080-21       89.4       73.4       70.2       51.3       25.5       58.6       36.9       57.9         19 NE00544       71.4       78.7       65.5       58.7       32.5       54.9       43.4       57.9         27 OK99215       67.8       68.9       82.0       55.0       33.7       55.1       42.3       57.8         5 T133       68.5       70.0       82.8       58.3       35.3       46.9       37.2       57.0         6 T139       74.6       70.1       67.0       56.3       37.2       54.1       38.7       56.9         38 C099141       71.2       82.2       73.7       57.4       30.6       37.8       44.6       56.8         13 G980122       63.8       70.6       72.6       62.7       28.3       57.3       39.2       56.4         12 G980039       84.7       70.8       69.2       58.5       22.2       50.8       35.7       56.0         14 G982163       73.5       60.0       66.8       49.9       34.2       50.5       33.3       52.6 <td>28</td> <td>KS940748-2-2</td> <td>75.1</td> <td>78.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	28	KS940748-2-2	75.1	78.0						
32       W96x1080-21       89.4       73.4       70.2       51.3       25.5       58.6       36.9       57.9         19       NE00544       71.4       78.7       65.5       58.7       32.5       54.9       43.4       57.9         27       OK99215       67.8       68.9       82.0       55.0       33.7       55.1       42.3       57.8         5       T133       68.5       70.0       82.8       58.3       35.3       46.9       37.2       57.0         6       T139       74.6       70.1       67.0       56.3       37.2       54.1       38.7       56.9         38       CO99141       71.2       82.2       73.7       57.4       30.6       37.8       44.6       56.8         13       G980122       63.8       70.6       72.6       62.7       28.3       57.3       39.2       56.4         12       G980039       84.7       70.8       69.2       58.5       22.2       50.8       35.7       56.0         14       G982163       73.5       60.0       66.8       49.9       34.2       50.5       33.3       52.6         2       Scout 66 <t< td=""><td>29</td><td>Overley</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	29	Overley								
19 NE00544       71.4       78.7       65.5       58.7       32.5       54.9       43.4       57.9         27 OK99215       67.8       68.9       82.0       55.0       33.7       55.1       42.3       57.8         5 T133       68.5       70.0       82.8       58.3       35.3       46.9       37.2       57.0         6 T139       74.6       70.1       67.0       56.3       37.2       54.1       38.7       56.9         38 CO99141       71.2       82.2       73.7       57.4       30.6       37.8       44.6       56.8         13 G980122       63.8       70.6       72.6       62.7       28.3       57.3       39.2       56.4         12 G980039       84.7       70.8       69.2       58.5       22.2       50.8       35.7       56.0         14 G982163       73.5       60.0       66.8       49.9       34.2       50.5       33.3       52.6         2 Scout 66       63.6       66.0       72.0       48.5       31.5       35.4       43.7       51.5         1 Kharkof       45.5       52.4       48.3       44.9       21.1       38.3       45.1       42.2	32	W96x1080-21	89.4							
27 OK99215     67.8     68.9     82.0     55.0     33.7     55.1     42.3     57.8       5 T133     68.5     70.0     82.8     58.3     35.3     46.9     37.2     57.0       6 T139     74.6     70.1     67.0     56.3     37.2     54.1     38.7     56.9       38 CO99141     71.2     82.2     73.7     57.4     30.6     37.8     44.6     56.8       13 G980122     63.8     70.6     72.6     62.7     28.3     57.3     39.2     56.4       12 G980039     84.7     70.8     69.2     58.5     22.2     50.8     35.7     56.0       14 G982163     73.5     60.0     66.8     49.9     34.2     50.5     33.3     52.6       2 Scout 66     63.6     66.0     72.0     48.5     31.5     35.4     43.7     51.5       1 Kharkof     45.5     52.4     48.3     44.9     21.1     38.3     45.1     42.2       Average     75.5     78.8     78.9     61.2     34.4     53.5     45.3       LSD 0.05     7.1     11.3     14.2     7.6     6.1     13.3     13.5	19	NE00544								
5 T133       68.5       70.0       82.8       58.3       35.3       46.9       37.2       57.0         6 T139       74.6       70.1       67.0       56.3       37.2       54.1       38.7       56.9         38 CO99141       71.2       82.2       73.7       57.4       30.6       37.8       44.6       56.8         13 G980122       63.8       70.6       72.6       62.7       28.3       57.3       39.2       56.4         12 G980039       84.7       70.8       69.2       58.5       22.2       50.8       35.7       56.0         14 G982163       73.5       60.0       66.8       49.9       34.2       50.5       33.3       52.6         2 Scout 66       63.6       66.0       72.0       48.5       31.5       35.4       43.7       51.5         1 Kharkof       45.5       52.4       48.3       44.9       21.1       38.3       45.1       42.2         Average       75.5       78.8       78.9       61.2       34.4       53.5       45.3         LSD 0.05       7.1       11.3       14.2       7.6       6.1       13.3       13.5	27	OK99215								
6 T139 74.6 70.1 67.0 56.3 37.2 54.1 38.7 56.9 38 CO99141 71.2 82.2 73.7 57.4 30.6 37.8 44.6 56.8 13 G980122 63.8 70.6 72.6 62.7 28.3 57.3 39.2 56.4 12 G980039 84.7 70.8 69.2 58.5 22.2 50.8 35.7 56.0 14 G982163 73.5 60.0 66.8 49.9 34.2 50.5 33.3 52.6 2 Scout 66 63.6 66.0 72.0 48.5 31.5 35.4 43.7 51.5 1 Kharkof 45.5 52.4 48.3 44.9 21.1 38.3 45.1 42.2 Average 75.5 78.8 78.9 61.2 34.4 53.5 45.3 LSD 0.05 7.1 11.3 14.2 7.6 6.1 13.3 13.5										
38 CO99141     71.2     82.2     73.7     57.4     30.6     37.8     44.6     56.8       13 G980122     63.8     70.6     72.6     62.7     28.3     57.3     39.2     56.4       12 G980039     84.7     70.8     69.2     58.5     22.2     50.8     35.7     56.0       14 G982163     73.5     60.0     66.8     49.9     34.2     50.5     33.3     52.6       2 Scout 66     63.6     66.0     72.0     48.5     31.5     35.4     43.7     51.5       1 Kharkof     45.5     52.4     48.3     44.9     21.1     38.3     45.1     42.2       Average     75.5     78.8     78.9     61.2     34.4     53.5     45.3       LSD 0.05     7.1     11.3     14.2     7.6     6.1     13.3     13.5										
13     G980122     63.8     70.6     72.6     62.7     28.3     57.3     39.2     56.4       12     G980039     84.7     70.8     69.2     58.5     22.2     50.8     35.7     56.0       14     G982163     73.5     60.0     66.8     49.9     34.2     50.5     33.3     52.6       2     Scout 66     63.6     66.0     72.0     48.5     31.5     35.4     43.7     51.5       1     Kharkof     45.5     52.4     48.3     44.9     21.1     38.3     45.1     42.2       Average     75.5     78.8     78.9     61.2     34.4     53.5     45.3       LSD 0.05     7.1     11.3     14.2     7.6     6.1     13.3     13.5										
12     G980039     84.7     70.8     69.2     58.5     22.2     50.8     35.7     56.0       14     G982163     73.5     60.0     66.8     49.9     34.2     50.5     33.3     52.6       2     Scout 66     63.6     66.0     72.0     48.5     31.5     35.4     43.7     51.5       1     Kharkof     45.5     52.4     48.3     44.9     21.1     38.3     45.1     42.2       Average     75.5     78.8     78.9     61.2     34.4     53.5     45.3       LSD 0.05     7.1     11.3     14.2     7.6     6.1     13.3     13.5										
14 G982163       73.5       60.0       66.8       49.9       34.2       50.5       33.3       52.6         2 Scout 66       63.6       66.0       72.0       48.5       31.5       35.4       43.7       51.5         1 Kharkof       45.5       52.4       48.3       44.9       21.1       38.3       45.1       42.2         Average       75.5       78.8       78.9       61.2       34.4       53.5       45.3         LSD 0.05       7.1       11.3       14.2       7.6       6.1       13.3       13.5										
2     Scout 66     63.6     66.0     72.0     48.5     31.5     35.4     43.7     51.5       1     Kharkof     45.5     52.4     48.3     44.9     21.1     38.3     45.1     42.2       Average     75.5     78.8     78.9     61.2     34.4     53.5     45.3       LSD 0.05     7.1     11.3     14.2     7.6     6.1     13.3     13.5										
1     Kharkof     45.5     52.4     48.3     44.9     21.1     38.3     45.1     42.2       Average     75.5     78.8     78.9     61.2     34.4     53.5     45.3       LSD 0.05     7.1     11.3     14.2     7.6     6.1     13.3     13.5										
Average 75.5 78.8 78.9 61.2 34.4 53.5 45.3 LSD 0.05 7.1 11.3 14.2 7.6 6.1 13.3 13.5										
LSD 0.05 7.1 11.3 14.2 7.6 6.1 13.3 13.5	<u>.</u>									44.4
						61.2	34.4		45.3	
CV % 5.7 8.7 10.9 7.5 10.8 15.2 18.1					14.2		6.1	13.3	13.5	
		CV %	5.7	8.7	10.9	7.5	10.8	15.2	18.1	

Table 5. Grain yield for Hatcher and other entries tested in dryland High Plains locations of the 2004 Southern Regional Performance Nursery (SRPN). **Hatcher and checks are bolded.** 

8 G980143 51.8 60.4 41.6 43.1 57.8 50.9 77 Hatcher 51.5 59.4 33.1 43.2 60.8 50.6 35 TX00D1390 48.0 64.9 43.3 42.9 49.9 49.8 55 KS01HW152-6 47.9 71.2 47.1 40.9 39.8 49.4 32 TX00V1117 43.5 68.0 38.0 38.0 58.5 49.2 26 C0970947-7 49.3 62.0 49.7 39.0 45.5 49.1 7 G991324 46.5 62.6 39.1 41.8 55.0 49.0 7 G991324 46.5 62.6 39.1 41.8 55.0 49.0 9 C000016 47.3 64.3 44.9 42.6 43.6 39.8 47.7 48.6 44 W03-20 48.9 63.0 40.4 41.2 47.8 48.2 25 C000007 42.9 62.2 37.2 43.0 54.1 47.9 30 C000698 42.7 64.3 55.3 44.8 50.2 47.5 41 W99-194 44.9 63.9 38.0 38.6 51.1 47.3 47 KS02HW34 46.6 60.9 41.6 38.0 49.1 47.2 37 NEO0403 41.5 61.6 38.2 44.5 51.3 47.0 38 TX96D1073 46.1 62.9 33.6 38.7 47.6 45.8 31 TX96D1073 46.1 62.9 62.9 44.5 51.3 40.0 42.2 45.1 44.8 31 TX96D1073 46.1 62.9 62.9 44.5 51.9 44.1 42.2 45.0 44.8 31 TX96D1073 46.1 62.9 63.8 44.9 44.9 44.0 44.0 44.0 44.0 44.0 44.0		RY/ID	Colby	Hays	G City	Julesburg	Akron	Average
185         TX00D1390         48.0         64.9         43.3         42.9         49.9         49.8           185         KS01HW152-6         47.9         71.2         47.1         40.9         39.8         49.4           182         TX00V1117         43.5         68.0         38.0         38.0         38.5         49.2           186         CO970547-7         49.3         62.0         49.7         39.0         45.5         49.1           7         G991324         46.5         62.6         39.1         41.8         55.0         49.0           90         CO000016         47.3         64.3         44.9         42.6         43.6         49.0           14         W03-20         48.9         63.0         40.4         41.2         47.8         48.2           15         CO00698         42.7         64.3         35.3         44.8         50.2         47.5           16         CO00698         42.7         64.3         35.3         44.8         50.2         47.5           17         KS02HW34         46.6         60.9         41.6         38.0         38.6         51.1         47.2           18         Ky89-1		G980143	51.8					
5 KS01HW152-6 47.9 71.2 47.1 40.9 39.8 49.4 49.2 71.00V1117 43.5 68.0 38.0 38.0 58.5 49.2 60.00076 47.3 62.0 49.7 39.0 45.5 49.1 6991324 46.5 62.6 39.1 41.8 55.0 49.1 6991324 46.5 62.6 39.1 41.8 55.0 49.1 6991324 46.5 62.6 39.1 41.8 55.0 49.1 6991324 46.5 62.6 39.1 41.8 55.0 49.1 6991324 46.5 62.6 39.8 47.7 48.6 95.000016 47.3 64.3 44.9 42.6 43.6 48.5 400.3 40.4 41.2 47.8 48.2 40.3 50.2 47.5 40.0 41.2 47.8 48.2 40.0 42.9 62.2 37.2 43.0 54.1 47.9 62.2 37.2 43.0 54.1 47.9 62.2 37.2 43.0 54.1 47.9 62.2 37.2 43.0 54.1 47.9 62.2 37.2 43.0 54.1 47.9 62.2 37.2 43.0 54.1 47.9 62.2 37.2 43.0 54.1 47.9 62.0 47.5 1 W99-194 44.9 63.9 38.0 38.6 51.1 47.9 44.6 60.9 41.6 38.0 49.1 47.2 7.0 44.5 51.3 47.0 44.5 51.3 47.0 44.5 51.3 47.0 44.5 51.3 47.0 44.5 51.3 47.0 44.5 51.3 47.0 45.2 47.5 61.8 38.2 42.4 41.5 46.3 1 TX96D1073 46.1 62.9 33.6 38.7 47.6 45.8 TAM 107 49.2 55.2 39.1 40.0 45.2 45.7 9.0 K00514 47.4 62.9 34.6 35.4 50.4 45.7 9.0 K00514 47.4 62.9 34.4 36.6 45.7 9.0 K00514 47.4 62.9 34.4 36.6 45.7 9.0 K00514 47.4 62.9 34.4 36.6 45.7 45.4 45.7 9.0 K00514 47.4 62.9 34.4 36.6 45.7 45.4 45.7 7.0 0 K00514 47.4 62.9 34.4 36.6 45.7 45.4 45.7 7.0 0 K00514 47.4 62.9 34.4 36.6 45.7 45.4 45.7 7.0 0 K00514 47.4 62.9 34.4 36.6 45.7 45.4 45.7 7.0 0 K00514 47.4 62.9 34.4 36.6 45.7 45.4 45.7 45.4 45.0 45.0 45.7 45.4 45.0 45.0 45.7 45.4 45.0 45.0 45.7 45.4 45.0 45.0 45.7 45.4 45.0 45.0 45.7 45.4 45.0 45.0 45.7 45.4 45.0 45.0 45.7 45.4 45.0 45.0 45.0 45.7 45.4 45.0 45.0 45.0 45.0 45.7 45.4 45.0 45.0 45.0 45.0 45.0 45.0 45.0	7	Hatcher	51.5	59.4	38.1	43.2	60.8	50.6
5 KS01HW152-6 47.9 71.2 47.1 40.9 39.8 49.4 22 TX00V1117 43.5 68.0 38.0 38.0 58.5 49.2 2 TX00V1117 43.5 68.0 38.0 38.0 58.5 49.2 69.2 140.0 49.7 39.0 45.5 49.1 6991324 46.5 62.6 39.1 41.8 55.0 49.1 6991324 46.5 62.6 39.1 41.8 55.0 49.1 699 CX00016 47.3 64.3 44.9 42.6 43.6 48.5 48.5 49.2 60.0 40.0 41.2 47.8 48.2 48.0 CX000D07 42.9 62.2 37.2 43.0 54.1 47.9 62.0 CX000D07 42.9 62.2 37.2 43.0 54.1 47.9 62.0 CX000D07 42.9 62.2 37.2 43.0 54.1 47.9 62.0 XY00.2 47.5 1 XY99-194 44.9 63.9 38.0 38.6 51.1 47.9 XY00.2 47.5 1 XY99-194 44.9 63.9 38.0 38.6 51.1 47.3 XY00.2 47.5 61.8 38.2 42.4 41.5 48.3 1 XY00.2 47.5 61.8 38.2 42.4 41.5 48.3 1 XY00.0 XY00.2 XY00.	5	TX00D1390	48.0	64.9	43.3	42.9	49.9	49.8
2 TX00V1117	5	KS01HW152-6						49.4
B	2	TX00V1117						
G991324		CO970547-7						
G990191								
9 CO00016								
4 W03-20         48.9         63.0         40.4         41.2         47.8         48.2           8 CO0DD07         42.9         62.2         37.2         43.0         54.1         47.9           0 CO00698         42.7         64.3         35.3         44.8         50.2         47.5           1 W99-194         44.9         63.9         38.0         38.6         51.1         47.3           7 KS02HW34         46.6         60.9         41.6         38.0         49.1         47.2           7 NE00403         41.5         61.6         36.2         44.5         51.3         47.0           4 KS00F5-20-3         47.5         61.8         38.2         42.4         41.5         46.3           1 TX96D1073         46.1         62.9         33.6         38.7         47.6         45.8           TAM 107         49.2         55.2         39.1         40.0         45.2         45.7           9 NE01481         42.1         59.3         41.0         35.4         50.4         45.7           9 K8950811-5-1         43.9         64.7         32.9         40.9         44.1         45.3           1 Trgo         50.4         60.2								
88       CO0DD007       42.9       62.2       37.2       43.0       54.1       47.9         10       CO00698       42.7       64.3       35.3       44.8       50.2       47.5         11       W99-194       44.9       63.9       38.0       38.6       51.1       47.3         7       KS02HW34       46.6       60.9       41.6       38.0       49.1       47.2         7       NE00403       41.5       61.6       36.2       44.5       51.3       47.0         4       KS00F5-20-3       47.5       61.8       38.2       42.4       41.5       46.3         1       TX96D1073       46.1       62.9       33.6       38.7       47.6       45.3         9       NE01481       42.1       59.3       41.0       35.4       50.4       45.7         9       NE01481       42.1       59.3       41.0       35.4       50.4       45.7         9       NE01481       42.1       59.3       41.0       35.4       45.7       45.4         1136       50.8       52.0       40.8       39.1       43.6       45.7       45.4         129       KV95011-15-1 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
0 CO0668								
1 W99-194								
7 KS02HW34 46.6 60.9 41.6 38.0 49.1 47.2 NEO0403 41.5 61.6 36.2 44.5 51.3 47.0 47.5 61.8 36.2 44.5 51.3 47.0 47.5 61.8 36.2 44.5 51.3 47.0 47.5 61.8 36.2 44.5 51.3 47.0 47.5 61.8 36.2 44.5 51.3 47.0 47.5 61.8 36.2 42.4 41.5 46.3 17.5 61.8 38.2 42.4 41.5 46.3 17.5 61.8 38.2 42.4 41.5 46.3 17.5 61.8 38.2 42.4 41.5 46.3 17.5 61.8 38.2 42.4 41.5 46.3 17.5 61.8 38.2 42.4 41.5 46.3 17.5 61.8 38.2 42.4 41.5 46.3 17.5 61.8 38.2 42.4 41.5 46.3 17.5 61.8 38.7 47.6 45.8 17.5 61.8 38.7 47.6 45.8 17.5 61.8 18.7 47.6 45.8 17.5 61.8 18.7 47.6 45.8 17.5 61.8 18.7 47.6 45.8 17.5 61.8 18.7 47.6 45.7 45.4 45.7 45.4 47.4 62.9 34.4 36.6 45.7 45.4 47.3 49.9 44.1 45.3 17.5 41.5 41.5 41.5 41.5 41.5 41.5 41.5 41								
7 NE00403								
4 KS00F5-20-3 47.5 61.8 38.2 42.4 41.5 46.3 17.9601073 46.1 62.9 33.6 38.7 47.6 45.8 TX9601073 46.1 62.9 33.6 38.7 47.6 45.8 TX9601073 49.2 55.2 39.1 40.0 45.2 45.7 9 NE01481 42.1 59.3 41.0 35.4 50.4 45.7 9 OK00514 47.4 62.9 34.4 36.6 45.7 45.4 25.5 22 KS950811-5-1 43.9 64.7 32.9 40.9 44.1 45.3 Trego 50.4 60.2 40.9 34.7 39.2 45.1 51.40 46.6 53.9 39.6 40.9 44.2 45.0 NE00564 42.4 51.9 42.1 38.7 47.8 44.6 47.0103232 44.2 63.5 33.4 38.1 42.8 44.4 36.0 KS00F5-14-7 44.5 61.0 34.2 36.6 45.6 44.4 31 AP0173131 46.2 53.1 36.8 39.2 46.1 44.3 AP0173131 46.2 53.1 36.8 39.2 46.1 44.3 AP0173131 46.2 53.1 36.8 39.2 46.1 44.3 AP0173131 46.2 53.1 36.8 39.2 46.1 34.3 AS0163-4 49.3 56.0 32.9 37.3 43.0 43.7 AS0163-4 AP017310 45.5 60.0 32.9 37.3 43.0 43.7 AS0163-4 AP017311-01 45.5 60.6 28.9 36.7 42.4 42.8 AS01640-1 40.6 56.5 36.4 36.8 45.9 43.3 NW98S097 44.3 50.8 34.5 29.4 55.2 42.8 AS01640-1 45.5 60.6 28.9 36.7 42.4 42.8 AS01640-1 45.5 50.8 34.5 29.4 55.2 42.8 AS01641-1 45.5 50.8 34.5 29.4 55.2 42.8 AS01641-1 45.5 50.8 36.5 36.9 36.0 40.4 42.6 AS01640-1 45.5 50.8 36.5 36.9 36.0 40.4 42.6 AS01640-1 45.5 50.8 36.5 36.9 36.0 40.4 42.6 AS01640-1 45.5 50.8 36.6 36.9 36.0 40.4 42.6 AS01640-1 45.5 50.8 36.6 36.9 36.0 40.4 42.6 AS01640-1 45.5 50.8 36.6 36.0 40.4 42.6 AS01640-1 45.5 50.8 36.6 36.0 40.4 42.6 AS01640-1 45.5 50.8 36.6 36.9 36.0 40.4 42.6 AS01640-1 45.5 50.0 46.0 29.7 35.8 48.2 40.9 AS0171112 45.0 46.0 29.7 35.8 48.2 40.9 AS01711112 45.0 46.0 29.7 35.8 48.2 40.9 AS017111112 45.0 46.0 29.7 35.8 48.2 40.9 AS017111112 45.0 46.0 29.7 35.8 36								
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Trego 50.8 52.0 40.8 39.1 43.6 45.3 Trego 50.4 60.2 40.9 34.7 39.2 45.1 5 140 46.6 53.9 39.6 40.9 44.2 45.0 NE00564 42.4 51.9 42.1 38.7 47.8 44.6 4 TX01D3232 44.2 63.5 33.4 38.1 42.8 44.4 33.5 KS00F5-14-7 44.5 61.0 34.2 36.6 45.6 44.4 AP01T3131 46.2 53.1 36.8 39.2 46.1 44.3 TX01A5936 44.5 64.9 32.5 41.9 36.7 44.1 65 KS01HW163-4 49.3 56.0 32.9 37.3 43.0 43.7 NW99L7068 48.1 58.3 35.3 38.9 37.5 43.6 SD97W604 40.6 56.5 36.4 36.8 45.9 43.3 NW98S097 44.3 50.8 34.5 29.4 55.2 42.8 2 W96x1311-01 45.5 60.6 28.9 36.7 42.4 42.8 2 W96x1311-01 45.5 60.6 28.9 36.7 42.4 42.8 3 W98-159-7 39.1 57.5 34.8 38.3 43.8 42.7 OK99212 47.3 49.9 39.2 36.0 40.4 42.6 3 OK00618W 41.2 54.8 35.8 35.9 35.5 39.0 42.2 3 54.8 35.5 39.5 39.0 42.2 3 54.8 35.5 39.5 39.0 42.2 3 54.8 35.5 39.5 39.0 42.2 3 54.8 35.5 39.5 39.0 42.2 3 54.8 35.6 34.0 41.4 42.2 50.7 33.4 30.4 45.7 41.5 Scout 66 38.6 51.7 33.6 40.0 42.7 41.3 AP01T1114 44.2 50.7 33.4 30.1 36.7 40.6 G982238-2 42.1 59.8 34.4 30.0 30.2 40.7 34.3								
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68         TX01A5936         44.5         64.9         32.5         41.9         36.7         44.1           66         KS01HW163-4         49.3         56.0         32.9         37.3         43.0         43.7           2         NW99L7068         48.1         58.3         35.3         38.9         37.5         43.6           8         SD97W604         40.6         56.5         36.4         36.8         45.9         43.3           3         NW98S097         44.3         50.8         34.5         29.4         55.2         42.8           2         W96x1311-01         45.5         60.6         28.9         36.7         42.4         42.8           3         W98-159-7         39.1         57.5         34.8         38.3         43.8         42.7           0         OK99212         47.3         49.9         39.2         36.0         40.4         42.6           3         NEO0435         42.3         54.8         35.8         35.9         44.3         42.4           3         T135         46.0         53.9         35.6         34.0         41.4         42.2           3         T135         46.0								
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8 SD97W604								
0       NW98S097       44.3       50.8       34.5       29.4       55.2       42.8         2       W96x1311-01       45.5       60.6       28.9       36.7       42.4       42.8         3       W98-159-7       39.1       57.5       34.8       38.3       43.8       42.7         0       OK99212       47.3       49.9       39.2       36.0       40.4       42.6         8       OK00618W       41.2       54.8       35.8       35.9       44.3       42.4         8       NE00435       42.3       54.8       35.5       39.5       39.0       42.2         3       T135       46.0       53.9       35.6       34.0       41.4       42.2         0       AP01T1114       44.2       50.7       33.4       33.4       45.7       41.5         Scout 66       38.6       51.7       33.6       40.0       42.7       41.3         5       Coy91132       42.7       52.2       31.3       35.9       42.8       41.0         AP01T1112       45.0       46.0       29.7       35.8       48.2       40.9         1       OK00614       41.5       51.7								
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5       KS00F5-57-8       43.4       53.4       29.6       35.1       45.1       41.3         6       CO991132       42.7       52.2       31.3       35.9       42.8       41.0         AP01T1112       45.0       46.0       29.7       35.8       48.2       40.9         I       OK00614       41.5       51.7       35.3       36.1       38.6       40.6         G982238-2       42.1       59.8       34.4       30.1       36.7       40.6         B       TX00V1131       42.1       52.7       30.1       26.0       48.6       39.9         C       OK00611W       38.8       52.0       28.6       36.9       30.0       37.3         T141       37.5       44.7       31.7       28.8       37.8       36.1         Kharkof       29.8       40.8       30.0       30.2       40.7       34.3         Mean       44.9       57.8       36.5       37.9       45.4	)							
9       CO991132       42.7       52.2       31.3       35.9       42.8       41.0         AP01T1112       45.0       46.0       29.7       35.8       48.2       40.9         I       OK00614       41.5       51.7       35.3       36.1       38.6       40.6         G982238-2       42.1       59.8       34.4       30.1       36.7       40.6         B       TX00V1131       42.1       52.7       30.1       26.0       48.6       39.9         C       OK00611W       38.8       52.0       28.6       36.9       30.0       37.3         T141       37.5       44.7       31.7       28.8       37.8       36.1         Kharkof       29.8       40.8       30.0       30.2       40.7       34.3         Mean       44.9       57.8       36.5       37.9       45.4								
AP01T1112		KS00F5-57-8						
I OK00614         41.5         51.7         35.3         36.1         38.6         40.6           G982238-2         42.1         59.8         34.4         30.1         36.7         40.6           B TX00V1131         42.1         52.7         30.1         26.0         48.6         39.9           C OK00611W         38.8         52.0         28.6         36.9         30.0         37.3           B T141         37.5         44.7         31.7         28.8         37.8         36.1           Kharkof         29.8         40.8         30.0         30.2         40.7         34.3           Mean         44.9         57.8         36.5         37.9         45.4								
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3 TX00V1131     42.1     52.7     30.1     26.0     48.6     39.9       7 OK00611W     38.8     52.0     28.6     36.9     30.0     37.3       3 T141     37.5     44.7     31.7     28.8     37.8     36.1       Kharkof     29.8     40.8     30.0     30.2     40.7     34.3       Mean     44.9     57.8     36.5     37.9     45.4		G982238-2	42.1		34.4	30.1	36.7	
7 OK00611W     38.8     52.0     28.6     36.9     30.0     37.3       6 T141     37.5     44.7     31.7     28.8     37.8     36.1       Kharkof     29.8     40.8     30.0     30.2     40.7     34.3       Mean     44.9     57.8     36.5     37.9     45.4								39.9
S T141     37.5     44.7     31.7     28.8     37.8     36.1       Kharkof     29.8     40.8     30.0     30.2     40.7     34.3       Mean     44.9     57.8     36.5     37.9     45.4								
Kharkof         29.8         40.8         30.0         30.2         40.7         34.3           Mean         44.9         57.8         36.5         37.9         45.4								
Mean 44.9 57.8 36.5 37.9 45.4								
CV 9.6 7.3 11.2 10.3 9.7								

Table 6. Milling and bread baking characteristics of Hatcher, Ankor, and Prowers 99 across three composite quality evaluations and three individual location evaluations between 2000 and 2002 (n=6 evaluations).

Trait (unit of measurement)	Hatcher	Ankor	Prowers 99
Grain volume weight (lb bu <sup>-1</sup> )	59.2	56.9	58.2
SKCS <sup>†</sup> kernel weight (mg)	28.5	25.2	26.3
SKCS kernel diameter (mm)	2.17	2.03	2.11
SKCS kernel hardness index (score)	71.8	73.3	80.0
Flour ash (g kg <sup>-1</sup> )	0.41	0.44	0.48
Flour extraction (g kg <sup>-1</sup> )	68.5	65.8	67.9
Flour protein content (%)	12.0	12.0	13.8
Mixograph water absorption (g kg <sup>-1</sup> )	61.8	61.5	64.9
Mixograph tolerance (score) <sup>‡</sup>	3.2	2.2	4.0
Mixograph mixing time (min)	3.2	2.9	4.0
Bake mix time (min)	4.2	3.6	5.1
Bake water absorption (g kg <sup>-1</sup> )	60.0	60.4	63.3
Loaf volume (L)	0.872	0.888	0.945
Crumb grain score (score)§	3.8	4.0	4.5

<sup>&</sup>lt;sup>†</sup> Single kernel characterization system (SKCS).

<sup>&</sup>lt;sup>‡</sup> Mixograph tolerance score: 6=outstanding, 0=unacceptable.

<sup>§</sup> Crumb grain score: 6=outstanding, 0=unacceptable.

REPRODUCE LOCALLY. Include form number and edition date on all reproductions U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held **EXHIBIT E** confidential until the certificate is issued (7 U.S.C. 2426). STATEMENT OF THE BASIS OF OWNERSHIP 1. NAME OF APPLICANT(S) 2. TEMPORARY DESIGNATION 3. VARIETY NAME OR EXPERIMENTAL NUMBER Colorado Wheat Descroch Hatcher CO180607 4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) 5. TELEPHONE (Include area code) 6, FAX (Include area code) 7100 Som Clinton Street 303-7-21-3300 *303-7*21-7555 Sure 120 7. PVPO NUMBER Centennial, CO BOLIZ 8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain.

Is the applicant (individual or company)	a U.S. national or a	U.S. based comp	eany? If no, give name of country.	□ NO
10. Is the applicant the original owner?	YES	THE W	if no, please answer <u>one</u> of the following:	W#T7V-4-4-4-
a. If the original rights to variety were	owned by individual	(s), is (are) the or	iginal owner(s) a U.S. National(s)?  If no, give name of country	
b. If the original rights to variety were	owned by a compar	ny(ies), is (are) th	e original owner(s) a U.S. based company?  If no, give name of country	

11. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

The cultivar that cher was deceloped at Colorado State UNIVERSITY by a fear bee by Dr. Scott Haley an employee of CSU. By agreement between Dr. Haley and CSU all rights to all about Cultivars developed by him whole employed by CSU are assigned to CSU. Oursership of Halehor has been transferred from CSU to the Colorado wheat Research Forndation, Inc. (address above)

#### PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

- 1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species,
- 2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
- 3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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